

U.S. Patent Application Serial No. 10/721,069
Response filed June 16, 2005
Reply to OA dated February 22, 2005

AMENDMENTS TO THE SPECIFICATION:

Amend the specification as follows:

Paragraph beginning at page 25, line 13, paragraph [0066] has been amended as follows:

[0066] The examples and comparative examples are evaluated by the following tests.

(1) Particle Diameter

Volume average particle diameter (Dv), number average particle diameter (Dp), particle diameter distribution (Dv/Dp), and number ratio of colored polymer particles having particle diameter not larger than 4 μm (namely $\leq 4 \mu\text{m}$, number %), were measured by means of a particle diameter analyzer (trade name: ~~Multisizer~~ MULTISIZER, product of Beckman-Coulter Inc.). The measurement was conducted under the following conditions:

aperture diameter: 100 μm ;

medium: ~~Isotone-H~~ ISOTONE II; and

number of particles subjected to measurements: 100,000.

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Paragraph beginning at page 26, line 14, paragraph [0069] has been amended as follows:

[0069] (4) Charge amount of the toner

A commercially available non-magnetic-one-component developing type printer with resolution of 600 dpi (trade name: ~~Microline~~ MICROLINE 3010C, product of Oki Data Corporation) was used. The printer was undisturbed over a day and a night at N/N condition, then 5 sheets were printed at printing density of 5 % using a toner to be tested. The toner on the developing roll was vacuumed with a vacuuming-type charge amount measuring apparatus, and charge amount per unit weight was obtained from measured values of charge amount and vacuumed weight.

Paragraph beginning at page 27, line 3, paragraph [0072] has been amended as follows:

[0072] (7) Fog.

The same printer as in the test (4) was used. The printer existed undisturbed over a day and a night at N/N condition. After 10 sheets were printed continuously at printing density of 5 %, white printing (printing density of 0 %) was achieved, then printing was terminated. After the white printing, the toner on the photoconductive member was stripped off and collected by sticking with an adhesive tape (trade name: ~~Scotch Mending Tape~~ SCOTCH MENDING TAPE 810-3-18, product of Sumitomo 3M Limited). Then the adhesive tape was peeled to stick it on a new sheet of paper to measure "hue (B)," using a spectrophotometer (trade name: SE2000, product of Nippon Denshoku

Industries Co., Ltd.). As a control, an adhesive tape alone was attached on another new sheet of paper to measure "hue (A)." Fog value was calculated and denoted as color difference ΔE^* after hue values were expressed as a coordinate in an $L^*a^*b^*$ space. Smaller value of ΔE^* means less fog.

Paragraph beginning at page 27, line 15, paragraph [0073] has been amended as follows:

[0073] Example 1

24 parts of methyl ethyl ketone and 6 parts of methanol was added and dispersed into 100 parts of negative charge control resin (trade name: FCA626N, product of Fujikura Kasei Co., Ltd., constitutional repeating units including sulfonic acid group: 7 weight %), and the resultant mixture was mixed and kneaded with a roll machine with cooling. After the mixture was winded on the rolls, 100 parts of a solid solution pigment (trade name: ~~Fuji Fast Carmin~~ FUJI FAST CARMIN 528, product of Fuji Colorant, including C.I. pigment red 150 and C.I. pigment red 31) was added gradually as a magenta pigment, the resultant mixture was agitated for a hour, and a negative charge control resin composition was obtained. Here, clearance between the rolls was 1 mm at beginning, broadened gradually, to 3 mm at end, and organic solvent (mixed solvent of methyl ethyl ketone / methanol = 4 / 1) was added occasionally according to mixing condition of the negative charge control resin composition. Added organic solvent was eliminated under reduced pressure after mixing was over.

Paragraph beginning at page 28, line 17, paragraph [0076] has been amended as follows:

[0076] The polymerizable monomer composition for core was poured into the colloidal dispersion medium of magnesium hydroxide (weight of the colloid: 8.4 parts), and the resultant mixture was stirred until droplets became stable. 1 part of triisobutyl mercaptan (product of Bayer A.G.), 1 part of tetraethyl thiuram disulfide (product of Ouchi Shinko Chemical Industrial Co., Ltd.) and six parts of t-butyl peroxy-2-ethylhexanoate (trade name: ~~Perbutyl-O~~ PERBUTYL O, product of NOF Corporation) were added to the mixture. Then the resultant dispersion was stirred, under high shearing force, at 15,000 rpm, for 30 minutes, by means of an ~~Ebara-Milder~~ EBARA MILDER (product of Ebara Corporation), to generate finer droplets of the polymerizable monomer composition. Thus obtained aqueous dispersion including the droplets of the polymerizable monomer composition for core was provided into a reactor equipped with an agitating blade. The dispersion was heated up to 90 °C to initiate a polymerization reaction. The reaction was achieved until the conversion ratio into a polymer reached almost 100%. Then the polymerizable monomer composition for shell and a solution of 0.2 parts of 2,2'-azobis{2-methyl-N-(2-hydroxyethyl) propionamide} (trade name: VA-086, product of Wako Pure Chemical Industries, Ltd.) dissolved into 65 parts of distilled water were provided into the reactor. After the polymerization reaction was continued for 8 hours, the reaction was stopped to obtain a dispersion including the core-shell structure colored polymer particle.

Paragraph beginning at page 29, line 18, paragraph [0078] has been amended as follows:

[0078] 100 parts of thus obtained colored polymer, 1.0 part cube shaped calcium carbonate with volume average particle diameter of 0.3 μm (trade name: CUBE-03BHS, Dv/Dp:1.26, density: 2.6 g/mL, product of Maruo Calcium Co., Ltd.), 0.5 part of fine silica particle with volume average particle diameter of 12 nm (trade name: RX-200, product of Nippon Aerosil Co., Ltd.) and 2.0 parts of fine silica particle with volume average particle diameter of 40 nm (trade name: RX-50, product of Nippon Aerosil Co., Ltd.) were mixed at 1,400 rpm for 10 minutes with a ~~Henschel mixer~~ HENSCHEL MIXER to obtain a toner. The printing properties and other properties of the obtained toner were evaluated. The results are shown in Table 1.

Paragraph beginning at page 30, line 10, paragraph [0081] has been amended as follows:

[0081] Comparative Example 2

The following materials were mixed and stirred with a Sand Stirrer to obtain a polymerizable composition:

100 parts of styrene;

35 parts of n-butyl methacrylate;

5 parts of methacrylic acid;

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0.5 part of 2,2'-azobis(2,4-dimethylvaleronitrile);

3 parts of low molecular weight polypropylene (trade name: ~~Viscol~~ VISCOL 605P, Sanyo Chemical Industries, Ltd.);

8 parts of carbon black (trade name: MA#8, product of Mitsubishi Chemical Corporation);
and

3 parts of chromium complex salt dye (trade name: ~~Aizen Spilon Black~~ AIZEN SPILON BLACK TRH, product of Hodogaya Chemical Co., Ltd.).

Then the resultant composition was subjected to polymerization reaction at 60 °C for 6 hours, in a aqueous solution of 6 weight/volume % gum arabic, with stirring at 4,000 rpm by means of a mixer (~~TK Auto Homo Mixer~~ TK AUTO HOMO MIXER, product of Tokushu Kika Kogyo Co., Ltd.).

After polymerization reaction, washed with ion exchanged water, dried, classified with wind force (blowing air), then a colored polymer particle with volume average particle diameter of 8 µm were obtained. Number ratio of the colored polymer particles having particle diameter not larger than 4 µm was 1.3 number %. Further the colored polymer particle was subjected to a surface treatment with a dispersion solution of a resin fine particle (a fine particle of fluorinated ethylene propylene copolymer, volume average particle diameter: 2 µm, product of Du Pont - Mitsui Fluorochemicals Co., Ltd.) dispersed sufficiently into a mixture of ethanol / water (volume ratio: 8/2) so that the proportion of the resin fine particle is 2.0 parts by weight per 100 parts by weight of the colored polymer particle. More specifically, the treatment was achieved by immersion method by means of

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a wet type surface reforming device (trade name: ~~Disper-Coat~~ DISPER COAT, product of Nissin Engineering Co., Ltd.) so that the resin fine particle adhered locally on the surface of the colored polymer particle. 100 parts of the thus obtained colored polymer particle and 0.3 part of a hydrophobicitized silica particle (trade name: R-974, volume average particle diameter: 12 nm, density: 2.2 g/mL, spherical shaped, product of Nippon Aerosil Co., Ltd.) were mixed at 1,500 rpm for 1 minute with a Henschel mixer to obtain a toner with volume average particle diameter of 8 μ m. The printing properties and other properties of the obtained toner were evaluated in the same manner as in Example 1. The results are shown in Table 1.